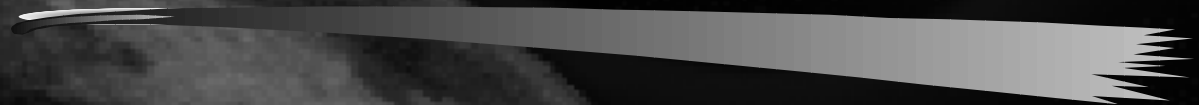




JAWS S3 Panel IV

Building the Analytical Bridge Between the Warfighter and the Engineer



Mr. Allen Murdock
Directorate of Command and Control
USAF/CCO

16 June 1999



Panel IV

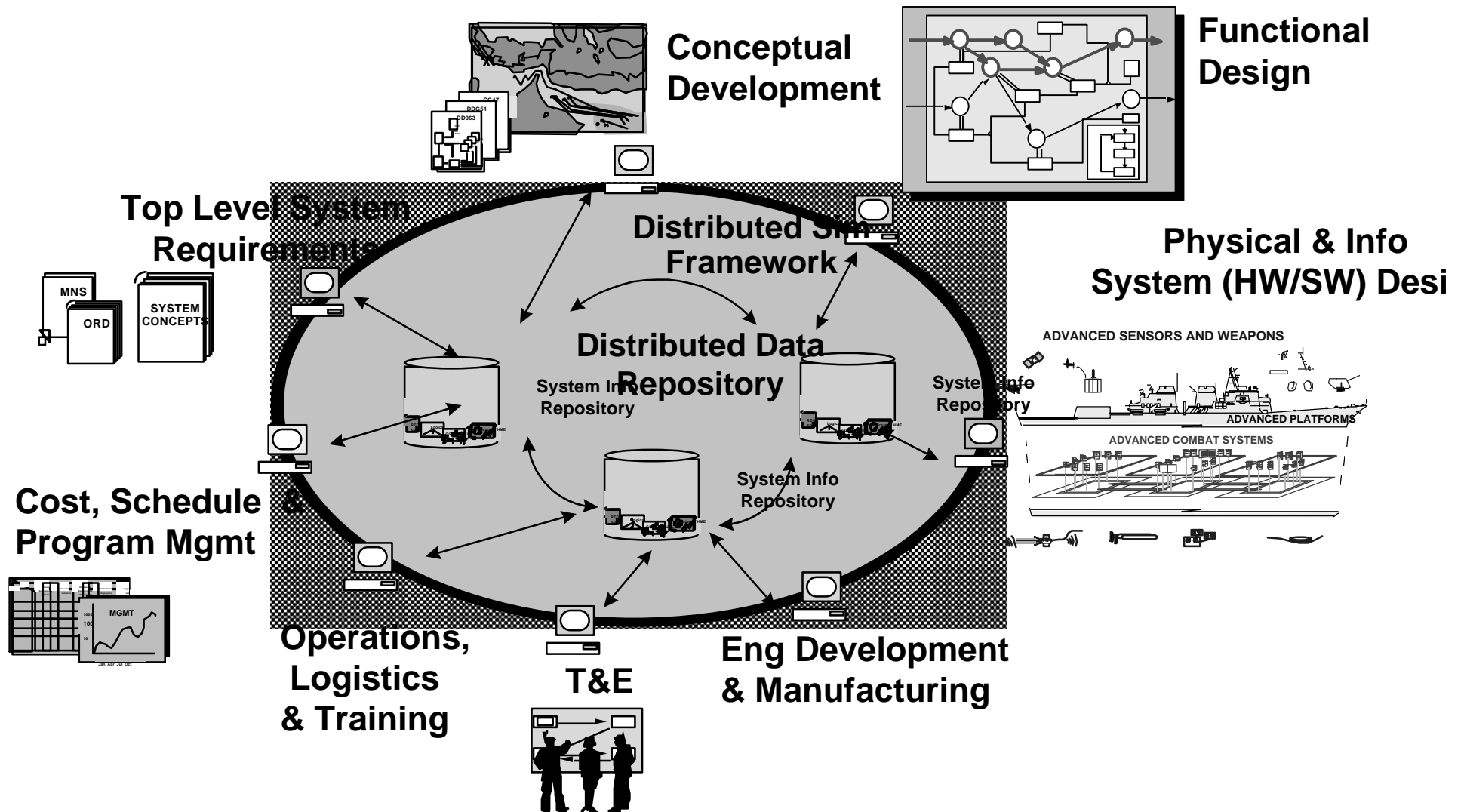


DIRECTORATE OF COMMAND & CONTROL

- Task: Build an analytical bridge between the warfighter and the engineer
 -
 - Byproduct: Create synergy (vice tension) between “requirements pull” and “tech push”
 -
- Framework: Simulation Based Acquisition
 - Examples of ‘bridges’:
 - JSF
 - USAF C2
 - Some bridge building tools:
 - AFRL Virtual Testbed
 - JMASS

SBA Operational Concept Illustration

(Digital Information Based Process)



Extensive Re-use Across Phases and Across Acquisition Programs



Simulation Based Acquisition



DIRECTORATE OF COMMAND & CONTROL

- Revamp acquisition process to capitalize on the advances, advantages & potential of digital information technology
-
- Use shared access to distributed information to:
 - Closely link stakeholders in product development
 - Facilitate iterative, spiral development
 - Facilitate collaborative, concurrent processes, IPPD
 - Create synergy between requirements pull & technology push



Anticipated SBA Impact on Analytical Link



DIRECTORATE OF COMMAND & CONTROL

- Better, more consistent models
- More support for development of M&S tools
- Better access to data, authoritative information
- Better synthetic environments
- Earlier access to product information
- Better understanding & definition of requirements
- Better linkage of requirements to performance
- Better understanding of thresholds
- Easier to identify & focus on prime OT&E areas
-



SBA Analytical Linkage: Examples



DIRECTORATE OF COMMAND & CONTROL

-
-
- Joint Strike Fighter
-
- USAF Command & Control



SBA Analytical Linkage Example: JOINT STRIKE FIGHTER



DIRECTORATE OF COMMAND & CONTROL

- **Delay locking in requirements**
 - JSF has used 'interim requirements'; no ORD until '00
- **Evolve requirements with an integrated set of simulations**
 - Campaign/mission modeling with constructive simulations (95-96)
 - Virtual simulations (w/man-in-the-loop)
 - Interactive digital simulations to evaluate specific functional requirements (97-99)
 - Virtual Strike Warfare Environment exercises (98)
- **Provide early weapon system experience for warfighters for conceptual development**
- **Use SBA analytical construct for cost & operational performance trades, within warfighter CONOPS**



SBA Analytical Linkage Example: AF Command & Control



DIRECTORATE OF COMMAND & CONTROL

- **ESC SBA initiative:**

Link requirements M&S tools/data (used by C4ISR operators) with system design & build tools/data (used by C4ISR developers)

- **Intent:**

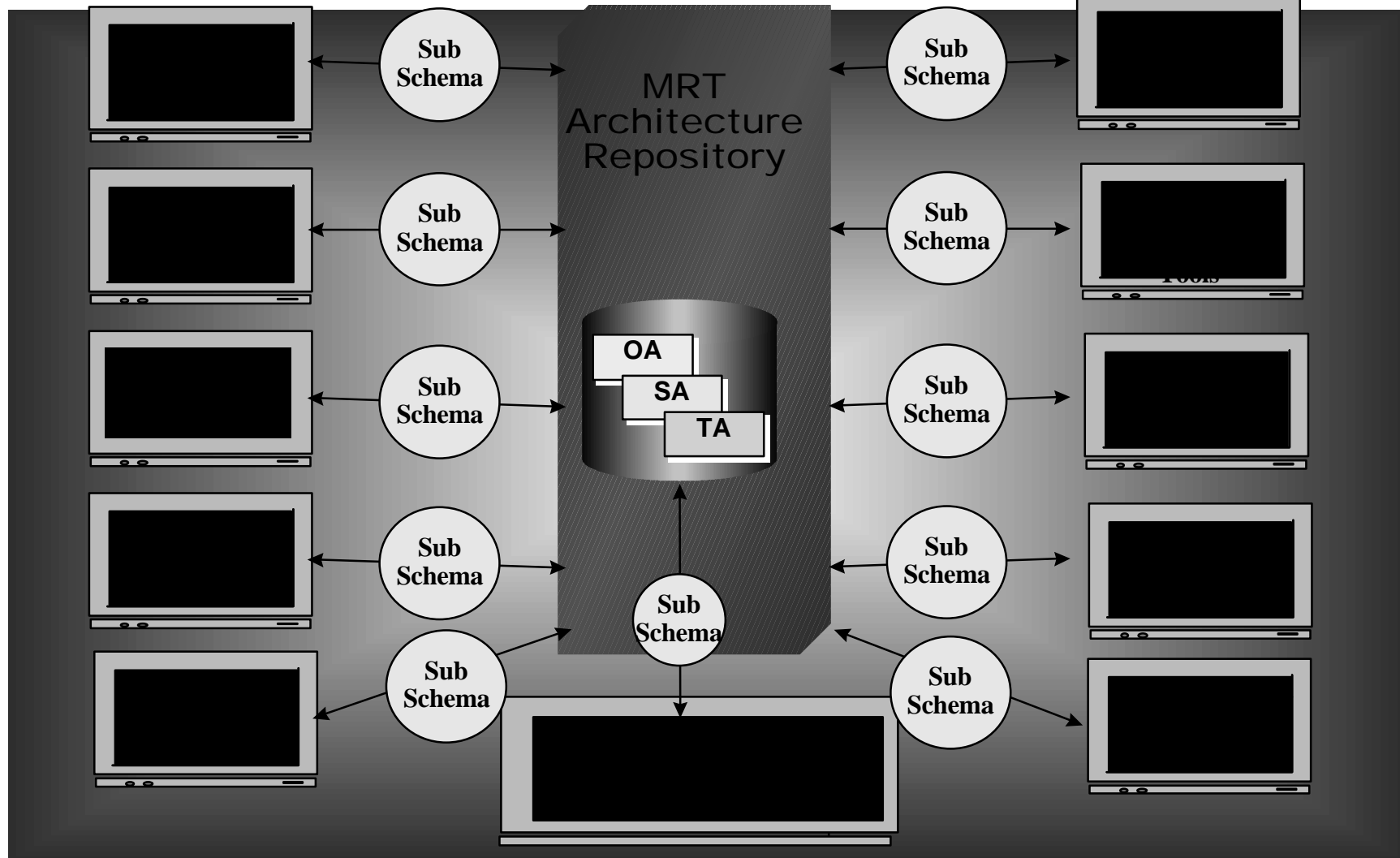
- Provide single continuous, traceable flow of data from operational need to system capability
- Integrate/map CINC C2 requirements with Service baseline system capability
- Merges Joint C4ISR Architecture & Planning System (JCAPS) and proven model-based system engineering process (Model Reference Technology)



SBA for C2 at ESC: Model Reference Technology



DIRECTORATE OF COMMAND & CONTROL

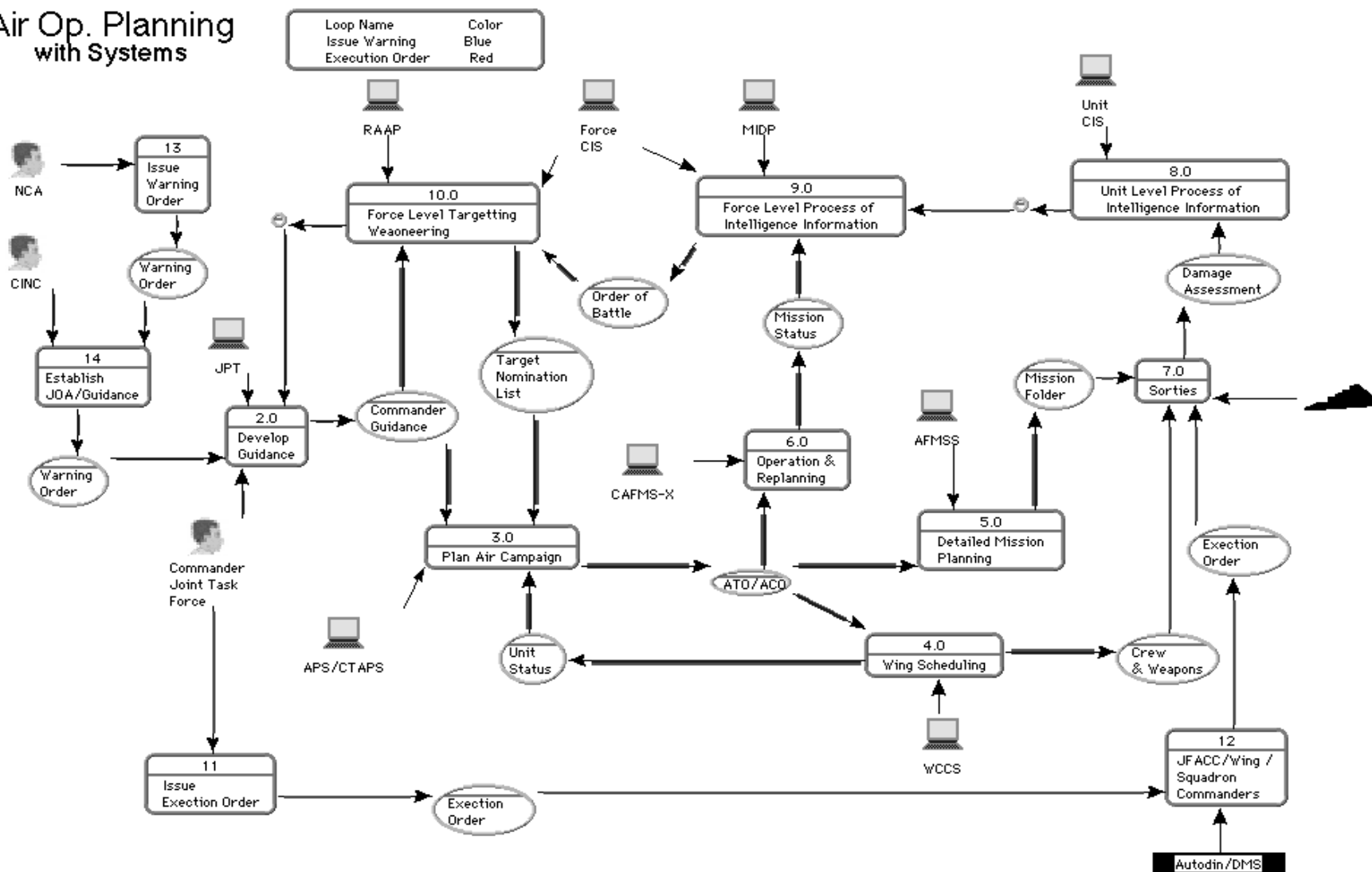




Integrated Operational/Systems Architecture Threads



Air Op. Planning with Systems





SBA Analytical Tools: Examples

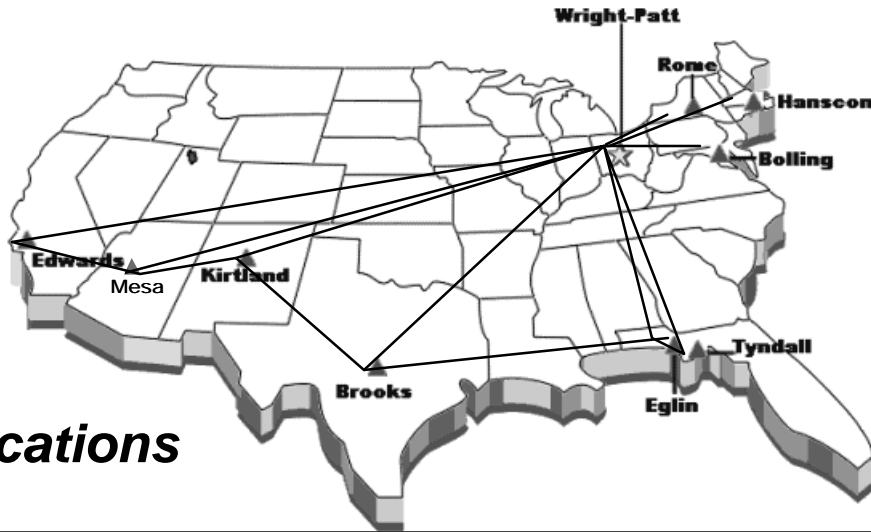


DIRECTORATE OF COMMAND & CONTROL

-
- AFRL Collaborative Enterprise Environment
-
- JMASS



AFRL Collaborative Environment Virtual Testbed

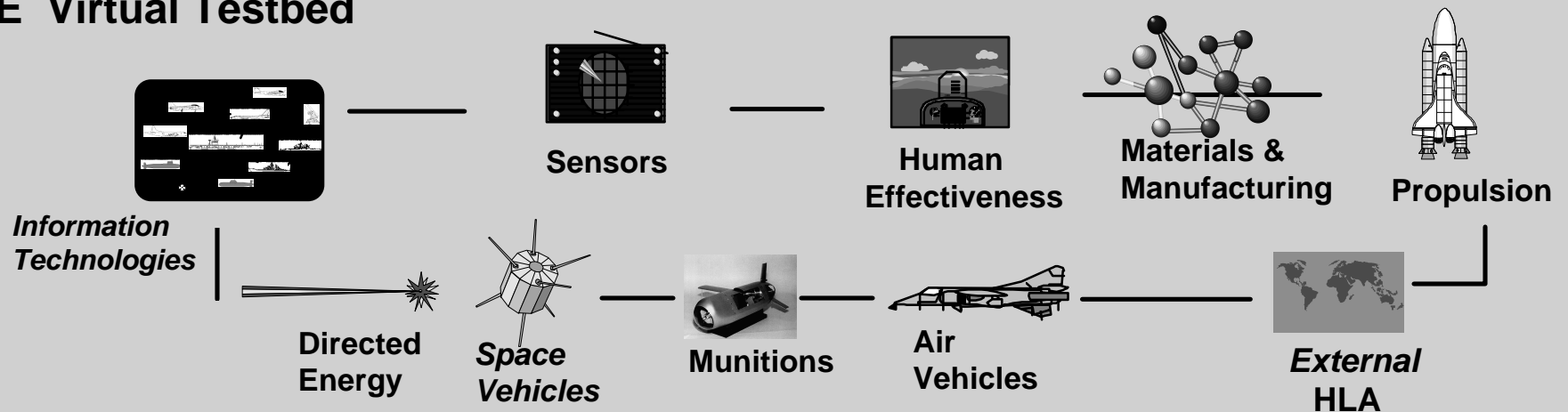


DIRECTORATE OF COMMAND & CONTROL

- Requirements Definition
- Technology Integration
- Survivability/Vulnerability
- Military Worth
- Virtual Flight Tests
- Seamless Constructive/
Virtual Simulation

AFRL Locations

CE Virtual Testbed



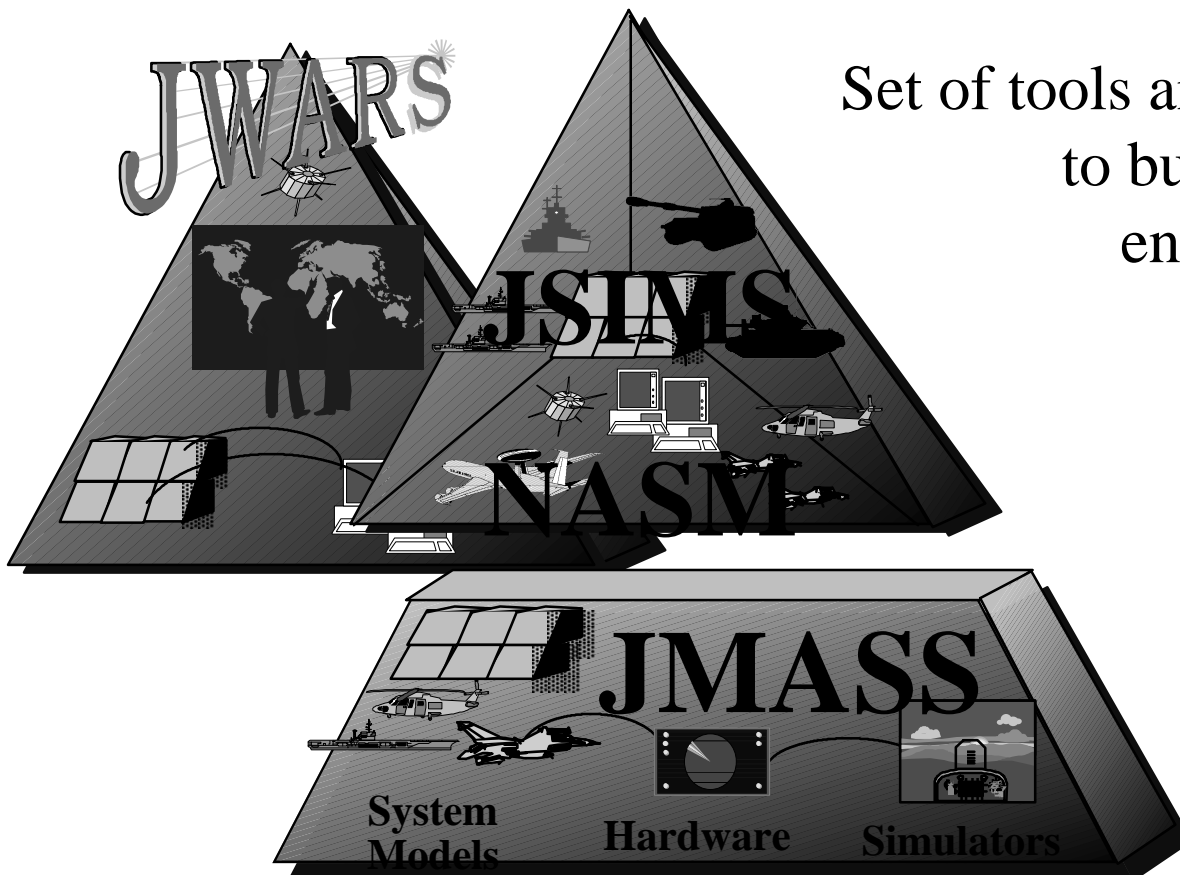
“The Network is the Simulator”



SBA Analysis Tool: JMASS



DIRECTORATE OF COMMAND & CONTROL



Set of tools and services that allow user to build, configure and execute engineering and engagement level simulations

Now a Joint Program



The Essence of JMASS

DIRECTORATE OF COMMAND & CONTROL

■ Model Standards

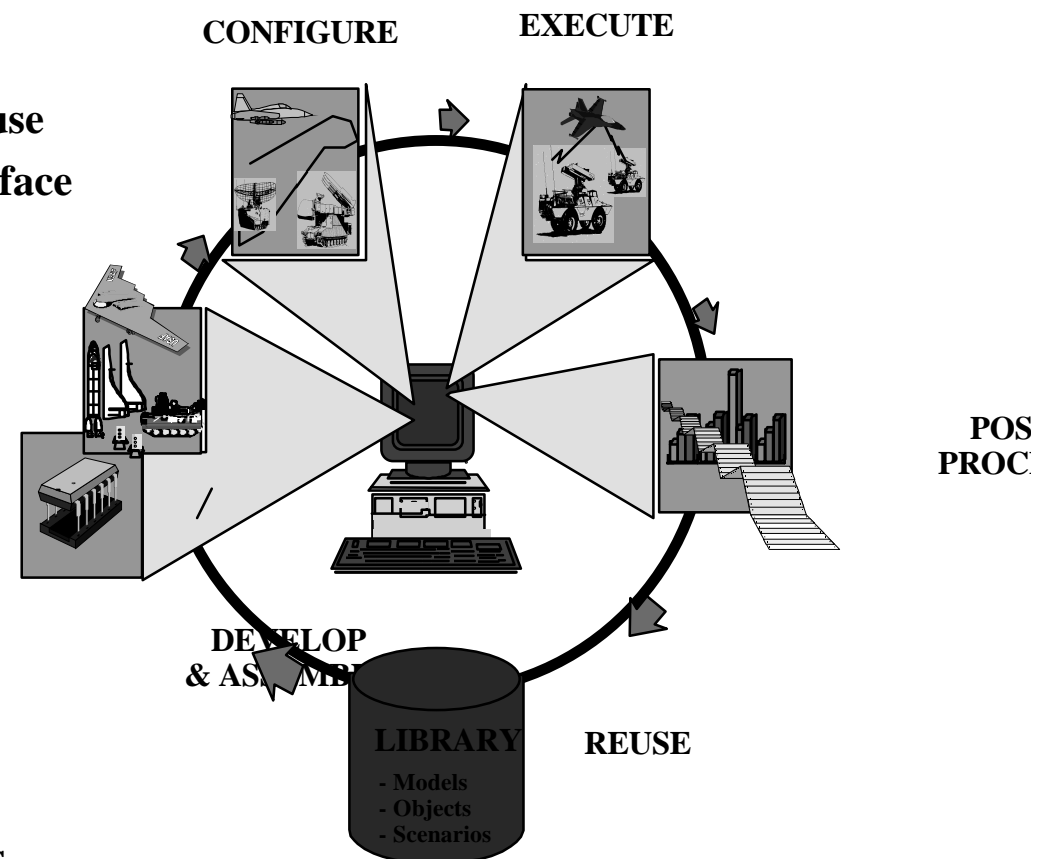
- ◆ SEI Software Structural Model for Reuse
- ◆ Model Application Programming Interface

■ Simulation Support Environment

- ◆ Simulation Engine
- ◆ Communications Architecture
- ◆ Visual Development Tools
- ◆ Analysis Tools
- ◆ COTS & Legacy Tool Interface

■ Model Library & Repository

- ◆ Local Model and Data Library
- ◆ Remote Model Repository
- ◆ Contains DIA-validated threat models



Yield is common, reusable, interoperable, validated models



Summary



DIRECTORATE OF COMMAND & CONTROL

- **Simulation Based Acquisition provides framework to analytically link warfighter to developer, other stakeholders**
- **SBA approach will emphasize and improve analytical tools, product models, visualization**
- **SBA will enhance access to critical authoritative information needed for warfighter and developer tradeoff decisions**
- **Programs are already embracing the SBA construct**